

**Modulhandbuch für den Studiengang /
Module manual of the study programme:
Master Interdisciplinary Engineering**

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Hinweise und Anmerkungen zu den Modulbeschreibungen

Das Modulhandbuch basiert auf den derzeit aktuellen Prüfungsordnungen.

1. **Lehrveranstaltung:** Eine Lehrveranstaltung kann verschiedene Lehrformen, z.B. Vorlesungen (V), Übungen (Ü), Laborübungen (L), Seminare (S) usf. enthalten.
2. **Modul:** Falls mehrere Lehrveranstaltungen zum gleichen Modul gehören, tragen sie gemeinsame Modulbezeichnungen.
3. **Modulverantwortlicher:** Angaben zum Modulverantwortlichen
4. **Lehrende/Prüfende:** Falls eine Lehrveranstaltung von mehreren Lehrenden/Prüfenden angeboten wird, ist für jeden weiteren Lehrenden/Prüfenden eine eigene Zeile anzufügen.
5. **Studienabschnitt:** BA-Studium (Bachelor-Studium), MA-Studium (Master-Studium), Fernstudium, Aufbaustudium. Die Angabe dient auch zur Definition des Niveaus.
6. **Semester:** gemäß Studienplan für Wintersemesterbeginner. Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner.
7. **Qualifizierungsziele:** kompakte Beschreibung
8. **Aufbauend auf:** Hier werden Module bezeichnet, die zur Belegung des Moduls empfohlen werden, jedoch nicht formal vorausgesetzt werden.
9. **Formale Voraussetzungen:** Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. Für Studierende der Bachelor-Studiengänge Maschinenbau, Wirtschaftsingenieurwesen, Sicherheitsingenieurwesen und der Dualen Bachelor-Studiengänge Maschinenbau (dual) und Wirtschaftsingenieurwesen (dual) gilt: Bezüglich der Zulassung zu Prüfungsleistungen ab dem 3. Semester ist die zugehörige Prüfungsordnung zu beachten.
10. **Prüfungsleistung:** Unter Prüfungsleistung sind die Prüfungsformen aufgeführt.
11. **Studienleistung:** Eine Studienleistung ist eine von einer/einem Prüfenden bewertete individuelle Leistung.
12. **SWS aufgeschlüsselt:** SWS nach Lehrform(en); (s. 1)
13. **ECTS:** European Credit Transfer System, 1 ECTS = 30 Arbeitsstunden
14. **Stellenwert der Note:** Als Stellenwert bezeichnet man den Anteil, mit dem die Note des Moduls in die Gesamtnote des Abschlusses eingeht.
15. **Selbststudium:** Zeit, die außerhalb der Präsenzveranstaltungen aufzubringen ist
16. **Kommentare:** bei Bedarf
17. **Bemerkungen:** bei Bedarf

ECTS-Punkte: Messen den Zeitaufwand der Studierenden einschließlich der häuslichen Arbeit für eine Lehrveranstaltung bzw. ein Modul im Gegensatz zu den üblichen SWS („contact hours“, die ein Maß für die Belastung der Lehrenden sind). Normale Semesterleistung: 30 ECTS-Punkte; unterstellte Arbeitsleistung bis zu 900 Std. pro Semester: 1 ECTS-Punkt entspricht also etwa 30 Stunden mittlerer Arbeitsaufwand eines Studierenden.

Hinweis zu Modulen anderer Fachbereiche: Bei den Modulen Ihres Studiengangs, die nicht in diesem Modulhandbuch aufgeführt sind, handelt es sich um Module aus anderen Fachbereichen. Informationen zu fast allen Brückenmodulen sind auf der Website des Fachbereichs Technik zu finden. Module aus Bauen + Leben sinden Sie auf deren Seiten. [Bauen + Leben](#)

Notes and comments on the module descriptions

The module manual is based on the current examination regulations.

1. **Course:** A course can contain different forms of teaching, e.g. lectures (V), exercises (Ü), laboratory performances (L), seminars (S), and so on.
2. **Module:** If several courses belong to the same module, they have common module names.
3. **Module coordinator:** Details of the person responsible for the module.
4. **Lecturer/Examiner:** If a course is offered by more than one lecturers/examiners, a separate line must be added for each additional lecturer/examiner.
5. **Level:** Bachelor course, master course, distance course, postgraduate course. The specification also serves to define the level.
6. **Course is given in semester:** According to the study plan for winter semester beginners. Summer semester beginners please refer to the study plan. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.
7. **Objectives:** compact description
8. **Based on:** Modules are designated here that are recommended for taking the module but are not formally required.
9. **Formal Prerequisites:** Prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances. For students of the bachelor programmes Mechanical Engineering, Industrial Engineering, Safety Engineering and the cooperative study programmes Mechanical Engineering (dual) and Industrial Engineering (dual) the following applies: Regarding the admission to examinations from the 3rd semester on, the respective examination regulations have to be observed.
10. **Exam performance:** The forms of examination are listed under exam performance.
11. **Study performance:** A study performance is an individual performance evaluated by an examiner.
12. **SWS categorisation of semester load:** SWS by teaching form(s); (s. 1)
13. **ECTS:** European Credit Transfer System, 1 ECTS = 30 working hours
14. **Final mark ration:** The ration value is the proportion with which the grade of the module is included in the overall grade of the degree.
15. **Self-study:** Time to be spent outside of the face-to-face studies.
16. **Comments:** if required
17. **Remarks:** if required

ECTS points: Measure the amount of time students spend on a course or module, including the work they do at home, in contrast to the usual SWS (“contact hours”, which are a measure for the load of the teachers). Normal semester performance: 30 ECTS points - assumed workload of up to 900 hours per semester. 1 ECTS point thus corresponds to about 30 hours of average workload of a student.

Note on modules from other departments: The modules of your study programme that are not listed in this module manual are modules from other departments. Information on almost all bridge modules can be found on the Engineering Department website. Modules from the Department of Civil and Supply Engineering + Food Technology can be found on their pages. [Civil and Supply Engineering + Food Technology](#)

Modulname	module name		gewählte Vertiefung/Kerndisziplin area of specialisation/core discipline											
Deutsch German	Englisch English	Lehrsprache Teaching language	ET	MB	GVE	WI	MT	FT	ECTS	Semester WS/SS	FR	Modulverantwortlicher Responsible for the module		
Powersystems	Powersystems-E	D	K	E	E	E	E	E	5	WS	ET	Brechtken		
Elektromagnetische Felder	Electromagnetic fields	D/E	K	E	E	E	E	E	5	SS	ET	Diewald		
Internet of Things/Industrie 4.0	Internet of Things /Industry 4.0	D/E	K	E	E	E	E	E	5	SS	ET	Lücken		
Lernende Systeme	Learning Systems	D/E	K	E	E	E	K	K	5	WS	ET	Haffner		
Medizinische Systeme 1	Medical systems 1	D/E	K	E	E	E	K	E	5	SS	ET	Feili		
Medizinische Systeme 2	Medical systems 2	D/E	K	E	E	E	K	E	5	WS	ET	Koch		
Projektmanagement	Project management	D	E	E	E	K	E	E	5	WS	ET	Jakoby		
Regelungstechnik	Control engineering	D	K	E	E	E	E	E	5	WS	ET	Scherer		
Singalverarbeitung	Signal processing	D	K	E	E	E	E	E	5	SS	ET	Seidenberg		
Theorie der Antriebstechnik	Theory of drive technology	D	K	E	E	E	E	E	5	SS	ET	Hupe		
Entwurf Elektrischer Maschinen	Design of electrical drives	D/E	K	E	E	E	E	E	5	SS	ET	Hupe		
CAE/Projektmanagement I	CAE/Project Management I (M)	D	E	K	E	E	E	E	5	SS	MB	Schuth		
CAE/Projektmanagement II	CAE/Project Management II (M)	D	E	K	E	E	E	E	5	WS	MB	Schuth		
Energieeffi. Fahrzeuge	Energy-efficient vehicles (M)	D	E	K	E	E	E	E	5	SS	MB	Zoppke		
Electronic Engine Management Systems	Electronic Engine Management Systems	E	E	K	E	E	E	K	5	SS	extern	König, Jaikumar, HITS		
Fahrzeugantriebe u. Fahrwerke	Vehicle Drives and Chassis (M)	D	E	K	E	E	E	E	5	SS	MB	Zoppke		
Fahrzeugsicherheit	Vehicle Safety	D/E	E	K	E	E	E	K	5	WS	MB	König, P.		
Fertigungstechnik	Production engineering (M)	D	E	K	E	E	E	E	5	WS	MB	Wittmann		
Finite Elemente Methode	Finite elements method (M)	D/E	E	K	E	E	E	K	5	SS	MB	Wohlers		
Höh. Maschinenelemente	Higher Machine Elements (M)	D	E	K	E	E	E	E	5	SS	MB	Bossong		
Mathematik	Mathematics (M)	D	E	K	E	E	E	E	5	WS	MB	Zimmermann		
Numerische Mathematik	Numerical mathematics (M)	D	E	K	E	E	E	E	5	SS	MB	Zimmermann		
Optische Messtechnik	Optical metrology (M)	D/E	E	K	E	E	E	K	5	SS	MB	Schuth		
Präzisionsmaschinen	Precision Machines (M)	D	E	K	E	E	E	E	5	WS	MB	Bossong		
Systemtechnik	Systems engineering (M)	D	E	K	E	E	E	E	7	SS	MB	Zimmermann		
Schwingungstechnik	Vibration engineering (M)	D	E	K	E	E	E	E	5	WS	MB	Wohlers		
Simulation dynamischer Systeme	Simulation of dynamic systems (M)	D	E	K	E	E	E	E	5	WS	MB	Zimmermann		
Statistik MB	Statistics MB (M)	D	E	E	E	K	E	E	5	SS	MB	Bär		
Strömungslehre	Fluid mechanics (M)	D	E	K	E	E	E	E	5	SS	MB	König, S.		
Technisches Messen	Technical measurement (M)	D	E	K	E	E	E	E	5	WS	MB	Schuth		
Thermodynamik	Thermodynamics (M)	D	E	K	E	E	E	E	5	WS	MB	Heinrich		
Turbomaschinen	Turbomachinery (M)	D/E	E	K	E	E	E	K	5	WS	MB	König, S.		
Unternehmensökonomik	Business Economics (M)	D	E	E	E	K	E	E	5	WS	MB	Bonart		
Vehicle Dynamics	Veicle Dynamics	E	E	K	E	E	E	K	5	SS	extern	König, Jaikumar, HITS		
Verbrennungsmotoren I	Internal combustion engines I (M)	D	E	K	E	E	E	E	5	WS	MB	Heinrich		
Verbrennungsmotoren II	Internal combustion engines II (M)	D	E	K	E	E	E	E	5	SS	MB	Heinrich		
Verkehrssysteme	Transportation systems (M)	D	E	K	E	E	E	E	5	WS	MB	Zoppke		
Volkswirtschaftslehre	Economics (M)	D	E	E	E	K	E	E	5	WP	MB	Bonart		
Werkzeugmaschinen und Produktionsanlagen I	Machine Tools and Production Equipment I (M)	D	E	K	E	E	E	E	5	WS	MB	Hofmann-von Kap-herr		
Werkzeugmaschinen und Produktionsanlagen II	Machine Tools and Production Equipment II (M)	D	E	K	E	E	E	E	5	SS	MB	Hofmann-von Kap-herr		
Wissenschaftliche Methodik	Scientific methodology (M)	D	K	K	K	K	K	K	5	WS	MB	Heinrich		
Ethik und Compliance	Ethics and compliance	D/E	E	E	E	K	E	E	5	SS	MB	Otten		

Materialwirtschaft u. Logistik	Materials Management and Logistics (M)	D/E	E	E	E	K	E	E	5	WS	MB	Wittmann
Qualität u. Zuverlässigkeit I	Quality and Reliability I (M)	D	E	E	E	K	E	E	5	SS	MB	Bonart
Qualität und Zuverlässigkeit II	Quality and Reliability II (M)	D	E	E	E	K	E	E	5	SS	MB	Bonart
Wettbewerb u. Innovation	Competition and Innovation (M)	D	E	E	E	K	E	E	5	SS	MB	Tzoppe/Draack
Internation. Management	International management (M)	D/E	E	E	E	K	E	E	5	WS	MB	König, P.
Programmierung von ERP-Systemen am Beispiel von SAP	Programming of ERP systems using SAP	D	E	E	E	K	E	E	5	SS	MB	Rudolph
Wirtschaftspsychologie	Business Psychology (M)	D	E	E	E	K	E	E	5	WS	MB	Draack
Energie- und Klimamanagement	Energy and Climate Management	D	E	E	K	E	E	E	5	SS	GVE	Neumeister
Simulation und Optimierung von Kraftwerken	Simulation and optimization of power plants	D	E	E	K	E	E	E	10	SS	GVE	Neumeister
Energieeffizienz in der Industrie II	Energy efficiency in industry II	D	E	E	K	E	E	E	5	WS	GVE	Neumeister
Abgasreinigung und Energieeffizienz	Emission Control and Energy Efficiency	D	E	E	K	E	E	E	5	WS	GVE	Reindorf
Netzintegration Erneuerbarer Energien	Electrical Grid Integration of Renewable Energies	D	E	E	K	E	E	E	5	WS	GVE	Bühler
Intelligente Stromnetze		D	E	E	K	E	E	E	5	SS	GVE	Bühler
Projektmanagement (BLV)	Project Management (BLV)	D	E	E	E	K	E	E	5	SS	GVE	Wilhelm
Asset Management von Wassernetzen	Asset Management of Water Supply Networks	D	E	E	K	E	E	E	5	WS	GVE	Wilhelm
Wasserstofftechnik	Hydrogen technology	D	E	E	K	E	E	E	5	SS	GVE	Döring
Wirtschaftsprivatrecht	Private BusinessLaw / Business Private Law	D	E	E	E	K	E	E	5	SS	GVE	Strotmann
Gastechnik III (H2, Planung , Bau, Betrieb, intelligente Gasnetze)	Gas technology III	D	E	E	K	E	E	E	5	WS	GVE	Döring
Gebäude- und Anlagensimulation	Building and Plant Simulation	D	E	E	K	E	E	E	5	WS	GVE	Jonas
Sektorenkopplung	Sector coupling	D	E	E	K	E	E	E	5	WS	GVE	Döring
Energieeffizienz in der Industrie I	Energy efficiency in industry I	D	E	E	K	E	E	E	5	SS		Neumeister
	Introduction to Management	E	E	E	E	K	E	E	5	WS	WI	Richter T.
	Organization and HR Management	E	E	E	E	K	E	E	5	SS	WI	Richter T.
	German as a foreign language	E	E	E	E	E	E	E	5	WS/SS	k.A.	tbd
	The Science of Biomedical Engineering	E					E		2,5	WS	extern	UNIWA, Athens, Greece
	Research Methodology	E					E		2,5	WS	extern	UNIWA, Athens, Greece
	Biology-Biotechnology	E					K		5	WS	extern	UNIWA, Athens, Greece
	The Biomedical Engineering Industry Sector I	E					K		5	WS	extern	UNIWA, Athens, Greece
	Biostatistics	E					K		5	WS	extern	UNIWA, Athens, Greece
	Medical Signal and Image Processing	E					K		5	WS	extern	UNIWA, Athens, Greece
	Biomedical Marketing	E					E		5	WS	extern	UNIWA, Athens, Greece
	Quality Assurance and Medical Device Regulations	E					E		5	WS	extern	UNIWA, Athens, Greece
	Biomechanics and Biomaterials	E					K		5	WS	extern	UNIWA, Athens, Greece
	Optical Microscopy	E					E		5	WS	extern	UNIWA, Athens, Greece
	Diagnostic Medical Imaging Systems	E					K		5	SS	extern	UNIWA, Athens, Greece
	Biomedical Instrumentation	E					K		5	SS	extern	UNIWA, Athens, Greece
	The Biomedical Engineering Industry Sector II	E					K		5	SS	extern	UNIWA, Athens, Greece
	Emergency Medicine	E					K		5	SS	extern	UNIWA, Athens, Greece
	Control Systems in Biomedical Engineering	E					K		5	SS	extern	UNIWA, Athens, Greece
	Bioinformatics	E					K		5	SS	extern	UNIWA, Athens, Greece
	Human Machine Interaction in Healthcare	E					K		5	SS	extern	UNIWA, Athens, Greece

	Machine Learning in Medicine and Biology	E					K		5	SS	extern	UNIWA, Athens, Greece
	Science, Technology, Society: Biomedical Engineering, Social Aspects, Ethics	E					E		5	SS	extern	UNIWA, Athens, Greece
GVE	Gebäude-, Versorgungs- und Energietechnik	Technical building services	https://www.hochschule-trier.de/hauptcampus/bauen-plus-leben/gve/studium/studiengaenge/energiemanagement-meng	K = Kern- disziplin	core discipline	study performance	E = ergän- zende Disziplin	comple- mentary discipline	prerequisite for admission to exam performance			
ET	Elektrotechnik	Electrical Engineering	https://www.hochschule-trier.de/hauptcampus/technik/studium/master-sg-technik/etmsc									
WI	Wirtschaftsingenieur	Industrial Engineering	https://www.hochschule-trier.de/hauptcampus/technik/studium/master-sg-technik/wimeng									
MB	Maschinenbau	Mechanical Engineering	https://www.hochschule-trier.de/hauptcampus/technik/studium/master-sg-technik/mbmeng									
MT	Medizintechnik	Medical Engineering	https://www.hochschule-trier.de/hauptcampus/technik/studium/master-sg-technik/etmsc									
FT	Fahrzeugtechnik	Automotive Technology	https://www.hochschule-trier.de/hauptcampus/technik/studium/master-sg-technik/mbmeng									
UNIWA, Athens, Greece			https://bmet.uniwa.gr/courses-2/1st-semester/									
UNIWA, Athens, Greece			https://bmet.uniwa.gr/courses-2/2nd-semester/									
UNIWA, Athens, Greece			https://bmet.uniwa.gr/courses-2/3rd-semester/									

Lehrveranstaltung ¹ / Course	Design of electrical drives			
Modul ² /Module	Design of electrical drives			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [compulsory elective module]			
Sprache/ Language	Englisch / English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.	Hellmut	Hupe
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.	Hellmut	Hupe
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	Topics covered: o Working with the Maxwell FEM program o Structure of a data record for the calculation of a magnetic circuit o Optimization of an electrical machine with regard to different criteria o Project work with Ansys Maxwell The number of Participants is limited to 9 due to the number of licences Prerequisite: Good knowledge of magnetic fields and electrical machines			
Lern- und Qualifizierungsziele ⁷ / Objectives	After successful completion of the module, students will understand the optimization process in the design of electrical drives with the help of simulation tools. They have knowledge of the basic mathematical procedures for the analysis of magnetic circuits. Furthermore, they are able to perform calculations for static problems magnetic circuits with the aid of an FEM program.			
Aufbauend auf ⁸ / Based on	Keine/none			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungsleistung ¹⁰ / Exam performance	Projektarbeit und mündliche Prüfung / project paper and oral exam			
Studienleistung ¹¹ / Study performance	Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no			
Zugelassene Hilfsmit- tel zur Erbringung der Prüfungsleistung / Ap- proved aids for the exam performance	None			

Literatur/Literature	<ul style="list-style-type: none"> • Tutorials of Ansys Maxwell
SWS gesamt/ Total semester load	2
SWS aufgeschlüsselt ¹² / Categorization of semester load	2 SWS Vorlesung
ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	120 Stunden/hours
Angeboten im / Offered in	Sommersemester / summer semester
Turnus / Rhythm	unregelmäßig / irregular
Dauer des Moduls / Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Participants are limited to 9

Lehrveranstaltung ¹ / Course	Electronic Engine Management Systems_E			
Modul ² /Module	Electronic Engine Management System_E			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [compulsory elective module]			
Sprache/ Language	Englisch / English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Peter	Koenig
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Peter	Koenig
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	Course Outcome: - familiarize with automotive instruments and sensors - gain knowledge about the measurement of engine parameters by using sensors - attain knowledge on the working of electronic ignition system - attain the principles of digital control systems and its applications - familiarize with the concept of engine mapping			
Lern- und Qualifizierungsziele ⁷ / Objectives	Course Syllabus Capter I: Fundamentals of automotive electronics Microprocessor architecture, open and closed loop control strategies, PID control, look up tables, introduction to modern control strategies like Fuzzy logic and adaptive control. A/D and D/A controllers. Chapter II: Sensors Types - mass air flow, manifold absolute pressure, temperature, Speed, EGO, Knock, and Crankshaft Position-Hall Effect-Principle of operation, construction, material and characteristics. Chapter III: SI Engine Management Mono point, multi point and direct injection systems - Principles and Features, Bosch injection systems- L - Jetronic and LH - Jetronic - Layout and working, open loop control and Lambda loop control in injection. Chapter IV: CI Engine Management Fuel injection system parameters affecting combustion, noise and emissions in CI engines. Inline injection pump, rotary pump an injector - Construction and principle of operation, Electronically controlled Unit Injection system. Layout of the common rail fuel injection system. Chapter V: Ignition systems and engine mapping Ignition fundamentals, types of solid-state ignition systems, high energy ignition distributors, Electronic spark timing and control. Combined ignition and fuel management systems. Digital control techniques - Dwell angle, Ignition timing and Injection duration calculation.			

Aufbauend auf ⁸ / Based on	Keine/none
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.
Prüfungsleistung ¹⁰ / Exam performance	Klausur / written exam
Studienleistung ¹¹ / Study performance	keine / none Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no
Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance	none
Literatur/Literature	
SWS gesamt/ Total semester load	4
SWS aufgeschlüsselt ¹² / Categorization of semester load	4 SWS Vorlesung
ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	90 Stunden/hours
Angeboten im / Offered in	Sommersemester / summer semester
Turnus / Rhythm	jährlich / annually
Dauer des Moduls Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	none
Bemerkungen ¹⁷ / Comments	Keine/none

Lehrveranstaltung ¹ / Course	German as Foreign Language			
Modul ² /Module	German as Foreign Language			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [compulsory elective module]			
Sprache/ Language	Deutsch / German			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Frau / Mrs.		Petra	Huy-Kraft
	Herr / Mr.		Alexeij	Zaitsev
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	german language lessons			
Lern- und Qualifizierungsziele ⁷ / Objectives	<p>The module will be offered in two variations:</p> <p>a) intensive German course (before semester start) This Intensive German course is intended to help students who have no or very little command of German to reach A1 level. The course is aimed at acquiring and developing written and oral communication skills and is guided by the requirements of the Common European Framework of Reference for Languages (CEFR). We will listen to audio texts introducing various new word -elds, structures and idioms based on the authentic reading. Students will practice their oral and written communication skills in simple everyday situations as well as reading and listening to texts on topics related to everyday life. In addition, comprehension strategies are practiced.</p> <p>b) German course during the semester In this course we will repeat A2, deepen it and - depending on the level of competence - work towards B1. We will talk a lot, but of course we will also practice grammar. Writing and listening are also part of language acquisition. As a basis for grammar we will use the book „Netzwerk Neu“</p>			
Aufbauend auf ⁸ / Based on	Keine/none			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungsleistung ¹⁰ / Exam performance	Schriftliche Prüfung / written exam			

Studienleistung ¹¹ / Study performance	keine / none Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no
Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance	
Literatur/Literature	
SWS gesamt/ Total semester load	4
SWS aufgeschlüsselt ¹² / Categorization of semester load	
ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	150 Stunden/hours
Angeboten im / Offered in	Winter- und Sommersemester / winter and summer semester
Turnus / Rhythm	jedes Semester / each semester
Dauer des Moduls Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Keine/none

Lehrveranstaltung ¹ / Course	Master Interdisciplinary Project			
Modul ² /Module	Master Interdisciplinary Project			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [required module]			
Sprache/ Language	Deutsch und Englisch / German and English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	The interdisciplinary project contains subject matter from at least two disciplines. The further definition of the content depends on the assigned topic. If possible, the inter disciplinary project to be worked on in a team.			
Lern- und Qualifizierungsziele ⁷ / Objectives	After successful completion of the module, students will be able to <ul style="list-style-type: none"> • analyze methodically through the accomplishment of qualified scientific interdisciplinary tasks, the content of which is oriented to the profile of the later professional activity, • develop solutions in the area of technical/informatic qualification, • compare approaches to solutions using scientific working methods, • independently analyze and solve problems, • to publish scientific papers on the work carried out. • Area-specific and cross-area discussions, where appropriate, in the self-organized team. 			
Aufbauend auf ⁸ / Based on	None			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungleistung ¹⁰ / Exam performance	Projektarbeit / project paper			
Studienleistung ¹¹ / Study performance	Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no			
Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance				

Literatur/Literature	<ul style="list-style-type: none"> • - Writing for Engineering and Science Students, Gerald Rau, Taylor & Francis Ltd. - According to the theme
SWS gesamt/ Total semester load	0
SWS aufgeschlüsselt ¹² / Categorization of semester load	
ECTS-Punkte ¹³ / ECTS-credits, Workload	10 ECTS, 300 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	300 Stunden/hours
Angeboten im / Offered in	Winter- und Sommersemester / winter and summer semester
Turnus / Rhythm	jedes Semester / each semester
Dauer des Moduls Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Keine/none

Lehrveranstaltung ¹ / Course	Master Interdisciplinary Seminar			
Modul ² /Module	Master Interdisciplinary Seminar			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [required module]			
Sprache/ Language	Deutsch und Englisch / German and English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	2. Semester / 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	The content of the interdisciplinary seminar is determined at the beginning of the semester. The selection of topics will be based on an interdisciplinary approach. Treatment of a complex topic emphasized. Within the seminar, each participant will give 2 presentations of 20 minutes each followed by a discussion in the group. In addition, a 4-page scientific paper will be written on the topic.			
Lern- und Qualifizierungsziele ⁷ / Objectives	Upon successful completion of the module, students will be able to, <ul style="list-style-type: none"> • systematically and purposefully identify scientific literature and publications, including those in English and related fields, by appropriate means, • Analyze and evaluate the contents of current, application-oriented and theoretical methods with regard to their relevance to the research question, • to elaborate and present the core of the content, • prepare professional presentations and present them in a convincing manner, • Discussions on scientific topics in the interdisciplinary discourse to be moderated. 			
Aufbauend auf ⁸ / Based on	None			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungsleistung ¹⁰ / Exam performance	Seminararbeit und Referat / seminar paper and presentation			
Studienleistung ¹¹ / Study performance	Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no			

Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance	
Literatur/Literature	<ul style="list-style-type: none"> • -Writing for Engineering and Science Students, Gerald Rau, Taylor & Francis Ltd. - According to the assigned theme
SWS gesamt/ Total semester load	2
SWS aufgeschlüsselt ¹² / Categorization of semester load	2 SWS Seminar
ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	120 Stunden/hours
Angeboten im / Offered in	Sommersemester / summer semester
Turnus / Rhythm	jährlich / annually
Dauer des Moduls Duration of module	
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Keine/none

Lehrveranstaltung ¹ / Course	Master Thesis M-IE			
Modul ² /Module	Master Thesis M-IE			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [required module]			
Sprache/ Language	Deutsch und Englisch / German and English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Klaus Peter	Koch
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	3. Semester / 3rd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	The content of the master thesis has an interdisciplinary character. This means that contents of different disciplines are integrated in the thesis. The further content depends on the assigned topic.			
Lern- und Qualifizierungsziele ⁷ / Objectives	Upon successful completion of the module, students will be able to, <ul style="list-style-type: none"> • to methodically analyze and develop scientific questions through the accomplishment of qualified development tasks, the content of which is oriented towards the profile of the later interdisciplinary professional activity. • to develop solutions in the field of engineering / informatics qualification, • with scientific/technical/informatic working methods compare and select solutions and justify the selection. • to recognize the framework of professional action in a situation appropriate and cross-situational manner and to reflect on decisions in a responsible and ethical manner. • to analyze and solve problems independently and to acquire new knowledge and skills on their own. • to write technical papers on the work carried out. Students will be able to present and discuss theoretical and methodological issues in front of and with experts in the field, to present and justify their work with sound reasoning.			
Aufbauend auf ⁸ / Based on	None			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungsleistung ¹⁰ / Exam performance	term paper with colloquium (elaboration of Master topic)			

Studienleistung ¹¹ / Study performance	Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no
Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance	
Literatur/Literature	<ul style="list-style-type: none"> • -Writing for Engineering and Science Students, Gerald Rau, Taylor & Francis Ltd. - According to the theme of the work
SWS gesamt/ Total semester load	0
SWS aufgeschlüsselt ¹² / Categorization of semester load	
ECTS-Punkte ¹³ / ECTS-credits, Workload	30 ECTS, 900 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	900 Stunden/hours
Angeboten im / Offered in	Winter- und Sommersemester / winter and summer semester
Turnus / Rhythm	jedes Semester / each semester
Dauer des Moduls Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Keine/none

Modulhandbuch/module manual Master Interdisciplinary Engineering Hochschule Trier/Trier University of Applied Sciences

Lehrveranstaltung ¹ / Course	Theory of drive technology			
Modul ² /Module	Theory of drive technology			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [compulsory elective module]			
Sprache/ Language	Deutsch / German			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.	Hellmut	Hupe
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.	Hellmut	Hupe
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	Topics covered: o Dimensioning of transformers and transient processes in transformers. o Surge short circuit for synchronous generators o Slot harmonics in the asynchronous machine o Transient behavior of the asynchronous machine o Field-oriented control of the asynchronous machine o Field-oriented control of the permanently excited synchronous machine o Calculation of linear drives taking into account the end-effecte			
Lern- und Qualifizierungsziele ⁷ / Objectives	After successful completion of the module, students will understand the dynamic properties of electric drives and will be able to reproduce various situations with the help of simulation tools. They have knowledge of the basic mathematical procedures for the analysis of dynamic problems. Furthermore, they are able to perform calculations for static as well as for dynamic problems magnetic circuits with the aid of an FEM program.			
Aufbauend auf ⁸ / Based on	Keine/none			
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.			
Prüfungsleistung ¹⁰ / Exam performance	mündliche Prüfung / oral exam			
Studienleistung ¹¹ / Study performance	keine / none Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no			
Zugelassene Hilfsmit- tel zur Erbringung der Prüfungsleistung / Ap- proved aids for the exam performance	None			

Literatur/Literature	<ul style="list-style-type: none"> • Dierk Schröder: Elektrische Antriebstechnik
SWS gesamt/ Total semester load	4
SWS aufgeschlüsselt ¹² / Categorization of semester load	2 SWS Vorlesung, 2 SWS Übung
ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	90 Stunden/hours
Angeboten im / Offered in	Sommersemester / summer semester
Turnus / Rhythm	jährlich / annually
Dauer des Moduls Duration of module	
Kommentare ¹⁶ / Comments	Module language: German
Bemerkungen ¹⁷ / Comments	Keine/none

Lehrveranstaltung ¹ / Course	Vehicle Dynamics_E			
Modul ² /Module	Vehicle Dynamics_E			
Studiengang/ Degree Programme	Master Interdisciplinary Engineering [compulsory elective module]			
Sprache/ Language	Englisch / English			
Modulverantwortliche/r ³ / Module Coordinator	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Peter	Koenig
Lehrende/r ³ / Lecturer	Anrede address	Titel title	Vorname First name	Nachname Last name
	Herr / Mr.	Prof. Dr.-Ing.	Peter	Koenig
Studienabschnitt ⁵ / Level	Master-Studium / master course			
Wird gehört im Semester ⁶ / Course is given in semester	1. oder 2. Semester / 1st or 2nd semester Bezieht sich auf Studienbeginn im Wintersemester. Sommersemesterbeginner sehen bitte in das Curriculum für Sommersemesterbeginner in der zugehörigen Fachprüfungsordnung. Refers to the start of studies in the winter semester. Summer semester beginners please see the curriculum for summer semester beginners in the corresponding examination regulations.			
Stoffinhalt/Contents	course outcome: - to Understand vibrating systems and its analysis, modeling and simulation and modal analysis - to understand various Suspension systems, selection of springs and dampers - to understand the stability of vehicles on curved track and slope, gyroscopic effects and cross wind handling - to know about tyres, ride characteristics and effect of camber, camber thrust - to learn about vehicle handling under different steering conditions and directional stability of vehicles			

Lern- und Qualifizierungsziele ⁷ / Objectives	<p>Course Syllabus</p> <p>Chapter I: Introduction</p> <p>Classification of vibration, definitions, mechanical vibrating systems, mechanical vibration and human comfort. Modelling and simulation studies. Model of an automobile, one degree of freedom, two degree of freedom systems, free, forced, and damped vibrations - Random vibration - Magnification and Transmissibility. Vibration absorber. Multidegree of Freedom Systems-Closed and far coupled system, orthogonality of modal shapes, modal analysis.</p> <p>Chapter II: Suspension</p> <p>Requirements, Spring mass frequency. Wheel hop, wheel wobble, wheel shimmy, Choice of suspension spring rate. Calculation of effective spring rate. Vehicle suspension in fore and aft directions. Hydraulic dampers and choice of damper characteristics. Independent, compensated, rubber and air suspension systems. Roll axis and vehicle under the action of side forces.</p> <p>Chapter III: Stability of vehicles</p> <p>Load distribution. Stability on a curved track and on a slope. Gyroscopic effects, weight transfer during acceleration and braking, overturning and sliding. Rigid vehicle - stability and equations of motion. Cross wind handling.</p> <p>Chapter IV: Tyres</p> <p>Types, Relative merits and demerits. Ride characteristics. Behavior while cornering, slip angle, cornering force, power consumed by a tyre. Effect of camber, camber thrust.</p> <p>Chapter V: Vehicle handling</p> <p>over steer, under steer, steady state cornering. Effect of braking, driving torques on steering. Effect of camber, transient effects in cornering. Directional stability of vehicles.</p>
Aufbauend auf ⁸ / Based on	Keine/none
Formale Voraussetzungen ⁹ / Formal prerequisites	Voraussetzung für die Vergabe von ECTS-Punkten ist das erfolgreiche Bestehen der aufgeführten Prüfungs- und Studienleistungen. / The prerequisite for the award of ECTS credits is the successful completion of the listed exam and study performances.
Prüfungsleistung ¹⁰ / Exam performance	Klausur / written exam
Studienleistung ¹¹ / Study performance	keine / none Voraussetzung zum Ablegen der Prüfungsleistung: nein Prerequisite for taking the exam performance: no
Zugelassene Hilfsmittel zur Erbringung der Prüfungsleistung / Approved aids for the exam performance	
Literatur/Literature	
SWS gesamt/ Total semester load	4
SWS aufgeschlüsselt ¹² / Categorization of semester load	4 SWS Vorlesung

ECTS-Punkte ¹³ / ECTS-credits, Workload	5 ECTS, 150 Stunden/hours
Stellenwert der Note ¹⁴ / Final mark ration	Berechnung der Gesamtnote gemäß Prüfungsordnung. Calculation of the overall grade according to the examination regulations.
Selbststudium ¹⁵ / Self-study	90 Stunden/hours
Angeboten im / Offered in	Sommersemester / summer semester
Turnus / Rhythm	jährlich / annually
Dauer des Moduls Duration of module	1 Semester / semester
Kommentare ¹⁶ / Comments	Keine/none
Bemerkungen ¹⁷ / Comments	Keine/none